



## 與小學生探索科學趣味 DISCOVERING THE FUN OF SCIENCE WITH PRIMARY STUDENTS

嶺大的科學通識教育不僅關顧校內學生，也同時惠及屯門的社區。在2016/17兩個學期裡，共有70位嶺大學生，引領約90名來自屯門三所小學的學生，一起探究科學知識。

曾修讀「生態環境：環境問題的科學」課程（包含服務研習元素）的嶺大三年級學生鄧適愉說：「我們要誘導小孩子對科學產生興趣，鼓勵他們學習和思考。」他帶領小學生做實驗，把垃圾轉化成可以爆發的火山，將博雅教育培養的探索精神及批判思考傳授給小孩子。

### 用諸於社會

把垃圾轉化成一個爆發的火山是「固體廢物管理」主題的其中一項活動。嶺大學生教導鄉師自然學校的小學生如何減少消耗、廢物利用、循環再造和廢物重用。在另一個與僑港伍氏宗親會伍時暢紀念學校合作的項目中，嶺大學生透過課堂活動和視像製作，與該校小學生探討「動物多樣性」、「哺乳類動物」、「魚菜共生」及「植物」等題目。

雖然教育界已加強推動STEM（科學、科技、工程、數學）教育，但統計資料顯示，許多小學教師對科學的「自我能力評估」，比其他科目為低，有些教師甚至不想在課堂上花太多時間教授科學。課程導師Mark McGinley教授表示，透過向小學生灌輸正面的科學體驗，希望令更多學生繼續對STEM科目感興趣。

向小朋友講解科學概念其實並不容易，對非主修科學的大學生來說難度就更高。然而，嶺大學生所付出的努力，令項目非常成功。在服務項目完成後，嶺大向鄉師自然學校、僑港伍氏宗親會伍時暢紀念學校及興德學校進行了意見調查，結果十分正面。McGinley教授說：「其中一位鄉師自然學校學生，在意見調查中就『跟嶺大學生學習』一項打分；在一到十的分數裡，這位學生竟打了200,000分！」

### 教學相長：激發對科學的興趣

大部分嶺大學生只修讀一個科學課程，難以在短時間內激發他們對科學領域的興趣。他們修讀「生態環境：環境問題的科學」課程時，需要為小學生準備一些有趣和互動的教學材料，同時引發他們對科學的興趣。

活動完結後，嶺大學生在班上進行了反思討論。他們講述當初如何嘗試在網上尋找可靠的資料，然後篩選搜集得來的材料，組織起來，展示給小學生看。McGinley教授說：「我期望學生可以學到一些重要的技能，其中之一就是尋找和處理科學資料的能力。」事實上，大部分參與的嶺大學生，通過擔當「教師」的角色，獲得不少科學知識。二年級學生關愷喬說：「我以為講授一些有關環境污染的基本常識很容易；但原來我的知識並不足夠。為了備課，我搜集了更多有關環保問題的詳細資料。」

### 重新認識教育

對McGinley教授和嶺大學生來說，與鄉師自然學校合作是一次獨特和喜出望外的經驗。鄉師自然學校是非傳統的實驗學校，沒有一般學校的課程架構和規條限制，著重從大自然中學習知識。對嶺大學生來說，這確是一項挑戰。但他們最終均能迎難而上，悉心設計課堂內容，令學生積極投入。三年級學生黃澄心說：「開始時非常洩氣，後來我由衷地享受與孩子們一起的時光——這個歷程既漫長但又難忘。」有些學生更深刻體會傳統教學的問題，明白小朋友在學習過程中的需要。

這次的經驗無疑提升了嶺大學生在溝通和組織方面的技能。二年級學生區清怡說：「為了確保小學生成功完成實驗，我與拍檔上課前先行試驗數次。我們學到了如何管理課室秩序，也學會與其他小組成員和諧合作，並懂得處理突發問題。對我來說，這是非常寶貴及難得的體驗。」

展望未來，McGinley教授希望「科學教研組」的發展能為嶺大學生帶來更多服務研習機會，並為社區作出貢獻。

General science education is having an important impact on Lingnan students as well as the wider community. Across two semesters in 2016/17, 70 Lingnan students shared scientific knowledge with around 90 primary students in three schools located in Tuen Mun.

"We were there to make children enjoy learning science. Our aim was to encourage them to learn and think," said Mirth Tang, a Year 3 Lingnan student who participated in the course "Ecology: The Science of Environmental Issues" which has a Service-Learning component. Through converting trash into an erupting volcano with the children, he is passing the liberal arts traits of inquisitive and critical thinking to the little minds.

### Serving a community need

Using trash to make volcanoes was one of the activities under the theme "Solid Waste Management", in which Lingnan students taught primary students at RTC Gaia School how to reduce, reuse, recycle and repurpose waste. In another project collaborated with H.K.E.C.A. Wu Si Chong Memorial School, Lingnan students explored the topics of "Animal Diversity", "Mammals", "Aquaponics" and "Plants" with primary students through in-class activities and video production.

Although increasing importance has been placed on Science, Technology, Engineering, and Math (STEM) education, statistics shows that the expressed "self-efficacy" in science of many primary school teachers is lower than for other subject areas and some even limit the time they spend on science in their classroom. By bringing positive experiences with science in primary schools, Prof Mark McGinley, the course instructor, hopes that more students will remain in the STEM pipeline.

Explaining scientific concepts to children can be challenging, especially for non-science majors. Yet, Lingnan students' efforts turned out to be a huge success when the post-service survey indicated positive feedbacks from primary students in RTC Gaia School, H.K.E.C.A. Wu Si Chong Memorial School and Hing Tak School. "One of the students from RTC Gaia School even rated 'Working with Lingnan students' as being 200,000 on a scale of 1-10!" said Prof Mark McGinley.



嶺大學生與鄉師自然學校學生一起進行科學實驗。  
Lingnan students conducted scientific experiments with students in RTC Gaia School.

### Beyond teaching – an increased interest in science

Since most students at Lingnan take only one science course during their university study, there are limited opportunities to excite them about the field of science. During the course of preparing interesting

and interactive classes for primary students, their own interest in science was aroused.

During in-class reflections, Lingnan students discussed how they tried to search for reliable information on the internet, sift through and organise relevant materials before presenting it to primary students. "Locating and processing scientific information is one of the most valuable skills that I expect my students to develop," said Prof McGinley. In fact, most of the Lingnan participants had gained knowledge in science as a "teacher". "I thought it was easy to teach basic knowledge about environmental pollution. Yet, what I knew was insufficient. I had to explore more about environment problems while preparing for class materials," said Year 2 student Michelle Kwan.

### A new understanding on education

For both Prof McGinley and the Lingnan students, working with RTC Gaia School was a unique and fascinating experience. As a non-traditional experiential school focuses on nature and not bound by rigid curriculum and discipline, its free learning style challenged the Lingnan students but many of them rose to the occasion and learned how to develop lessons that actively engaged the Gaia students. "From being extremely frustrated to genuinely enjoying the time spent with the kids, it has been a long yet unforgettable journey," said Twinkie Wong. Some participants even identified the problems of traditional educational approach and understood more about the needs of children in their learning process.

The experience no doubt boosted Lingnan students' communication skills and organisation skills. "My partner and I had to try the experiment a few times to ensure the primary students can achieve the result successfully. We learned to manage the classroom, worked with other group members in harmony and coped with unforeseen problems. It's a once-in-a-lifetime experience for me," said Year 2 student Alexis Au.



在嶺大學生的指導下，僑港伍氏宗親會伍時暢紀念學校學生在仁愛堂社區中心進行關於「魚菜共生」的訪問。  
Under the supervision of Lingnan students, students from H.K.E.C.A. Wu Si Chong Memorial School conducted interviews about the aquaponics system at Yan Oi Tong Community Centre.

Looking ahead, Prof McGinley hopes that the development of the Science Unit will bring even more Service-Learning opportunities to Lingnan students and create positive changes in the community.